



**A New Paradigm for
Sustainable Urban Transport**

Asian Development Bank

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IS TRYING HARDER REALLY THE SOLUTION?

How can city transport systems keep pace with exponential urban growth? What must policy makers do to provide an ever-growing population with the access it needs while ensuring a healthy and attractive urban environment? Increasingly, stakeholders have looked to transport measures as a means to relieve traffic congestion, pollution, accidents, and greenhouse gases and to improve residents' quality of life. But even after vast investments, living conditions in most developing cities continue to deteriorate.

Many of the reasons for this phenomenon can be traced to past transport measures. Developing cities expand rapidly, with today's fringe becoming tomorrow's developed city and the day-after-tomorrow's core city. But too often, policy makers have focused on here-and-now problems and done little to guide the future city. The result has been much infrastructure in the city center and little development at the periphery, with projects designed to increase mobility rather than to foster accessibility. More quickly than anticipated, this has translated into urban sprawl, more pollution, large under-serviced areas, and inferior living conditions for poorer residents in the city.

As difficult as today's conditions may seem, however, tomorrow's challenges will be greater still. Asia's cities are expected to grow by over 40 million per annum in coming years; at the same time, car ownership in many cities is doubling every 3 to 7 years and urban poverty is on the rise. The consequences for equity, political stability, and residents' quality of life are threatening. The time has come to change course towards a very different and more promising direction—the time has come to adopt a new paradigm for sustainable urban transport.

A CRISIS IN URBAN TRANSPORT

To create a paradigm for the future, we must first confront the mistakes of the past. In 2007–2008, the Asian Development Bank (ADB) conducted an in-depth study of five Asian cities: Dhaka, Bangladesh; Changzhou and Harbin in the People's Republic of China; Kathmandu, Nepal; and Colombo, Sri Lanka. These cities were selected as a representative sample of cities in the region. ADB's analysis revealed that insofar as transport was concerned, most policies were unsustainable, few were implemented (usually only main roads within the city), and when implementation did occur, outcomes were hardly ever evaluated.

ADB's five-city study identified the major problems:

Absence of a city development strategy. Too often transport planning took place in a vacuum. Municipal planners had not developed a city vision or a spatial strategy to establish the direction in which the city should expand and it was unclear what transport action was meant to deliver.

Unsustainable transport policies. All five cities' transport policies had been developed as transport model black boxes, with specialists, heavily represented by engineers, seeking to solve the mathematical problem of increasing the volume of vehicles rather than the social problem of ensuring that end users could access services. Indeed, while much data had been collected on vehicle flows, little was known about the movement of people. As a result, transport policies catered to increases in traffic with large infrastructure projects that caused traffic to grow even more. In addition, all policies were developed under highly optimistic assumptions about the cities' futures (their economic growth, their affordability, and their vehicle increases). Rather than stress-testing various projects and strategies, the cities assumed a single deterministic future scenario. Dhaka alone attempted to consider risk.

Ineffective transport planning. Transport planning was considered a task for the experts. The black box model disenfranchised stakeholders who had little buy-in and who were skeptical that new policies would be effective or relevant. Plans failed to prioritize subprojects and were not resilient enough to adapt to unforeseen circumstances.



Poor sidewalks force people to walk on the road

Little implementation. All plans were characterized by a disconnect between what was planned, what was budgeted, and what was implemented. Planning had little impact, and where implementation did occur, it did not affect core priorities.

Little assessment. In cases where plans were implemented, little was known about the extent to



Traffic chaos reduces efficiency and results in pedestrian–vehicle conflict

which they were successful. While some risk analysis and management and performance assessments took place, planners simply did not assess the degree to which the implementation of policies resulted in the achievement of policy goals.

Governance problems. Too often, technical studies were used to justify political decisions, not to provide sound advice. As a result, policies reflected political interests rather than users’ interests. In addition, responsibilities for implementing transport policy were fragmented among diverse city entities. Only Changzhou had strong, empowered institutions. In the other four cities, poorly defined responsibilities at the central government and city levels created an ambiguous framework that left decision-making bodies unable to deliver on their promises.

These observations make it clear that these and other Asian cities face a crisis of policy, planning effectiveness, budgeting, implementation and governance insofar as urban transport is concerned. Focused on meeting ever-growing demand, many transport programs failed to

attenuate and sometimes even exacerbated problems of pollution, urban sprawl, poverty, and a deteriorating quality of life.

At the same time, cities are becoming more, not less, challenging to manage. Today’s future is defined by the increasing pace of change, growing uncertainty and risk, more and more demanding stakeholders, and an ever more urgent policy agenda. Just 7 years ago, for example, energy security, climate change, and terrorism were of low priority. These issues now require extensive attention but are difficult, if not impossible, to forecast. Meanwhile, former issues have not gone away—far from it: poverty alleviation remains ADB’s overarching goal. The core problem facing the sector is therefore that of **managing dynamic complexity**. There is the ever-present danger that planners focus on the latest urgent problem without adopting a balanced strategy to keep on course. Climate change is an example: few question its importance, but it would be imprudent to implement climate change mitigation policies without thinking through their wider implications for urban transport and development.

A NEW PARADIGM

ADB's new paradigm for sustainable urban transport (SUT) offers the prospect of much more effective management of the region's cities over coming years. As formidable as the challenges are, commitment and resources can empower stakeholders to make changes and accomplish what everyone is clamoring for: place our cities on a more sustainable trajectory.



Reclaiming the urban environment in Cheonggyecheon, Republic of Korea

ADB's SUT paradigm has five core elements:

- Transport policy is defined by what works. No longer is policy the preserve of the technical specialist: stakeholders—including end users—participate in the policy-making process to ensure that plans and projects reflect actual needs.
- Land use planning is part of the solution. The erstwhile link between land use and transport planning is recreated to facilitate the provision of public transport and reduce the need for travel.
- Transport demand is managed to supply and projects are centered on traffic restraint and the greater use of public transport. No longer is road traffic capacity automatically expanded in response to demand forecasts.
- Transport plans and projects reflect a wider city vision or spatial strategy. They are also affordable, adaptable, and implementable. Furthermore, policy makers recognize that soft measures such as public transport advertising, internet shopping, telecommuting and teleconferencing, and better information are effective ways to influence behavior.
- Policy effectiveness is demonstrated to a skeptical stakeholder community.

Taken together, these elements comprise a fundamental change of direction. ADB's new paradigm moves from technical, opaque policy-making to participatory, evidence-based policy-making in which the transport planning profession collaborates with other stakeholders to develop policies that balance the needs of all sectors of society. Instead of reacting to inevitable phenomena, the new approach is proactive and maintains constant focus on the overall purpose of transport planning: the development of sustainable and socially inclusive cities.

“A realistic and relatively low cost urban structure/transport strategy for newly motorizing Asian cities is to accept high urban densities but to try to slow motorization and aim to enhance non-automobile alternatives in order to prevent unacceptable local pollution and congestion. This strategy also helps ameliorate rapidly rising GHG (greenhouse gas) emissions.”

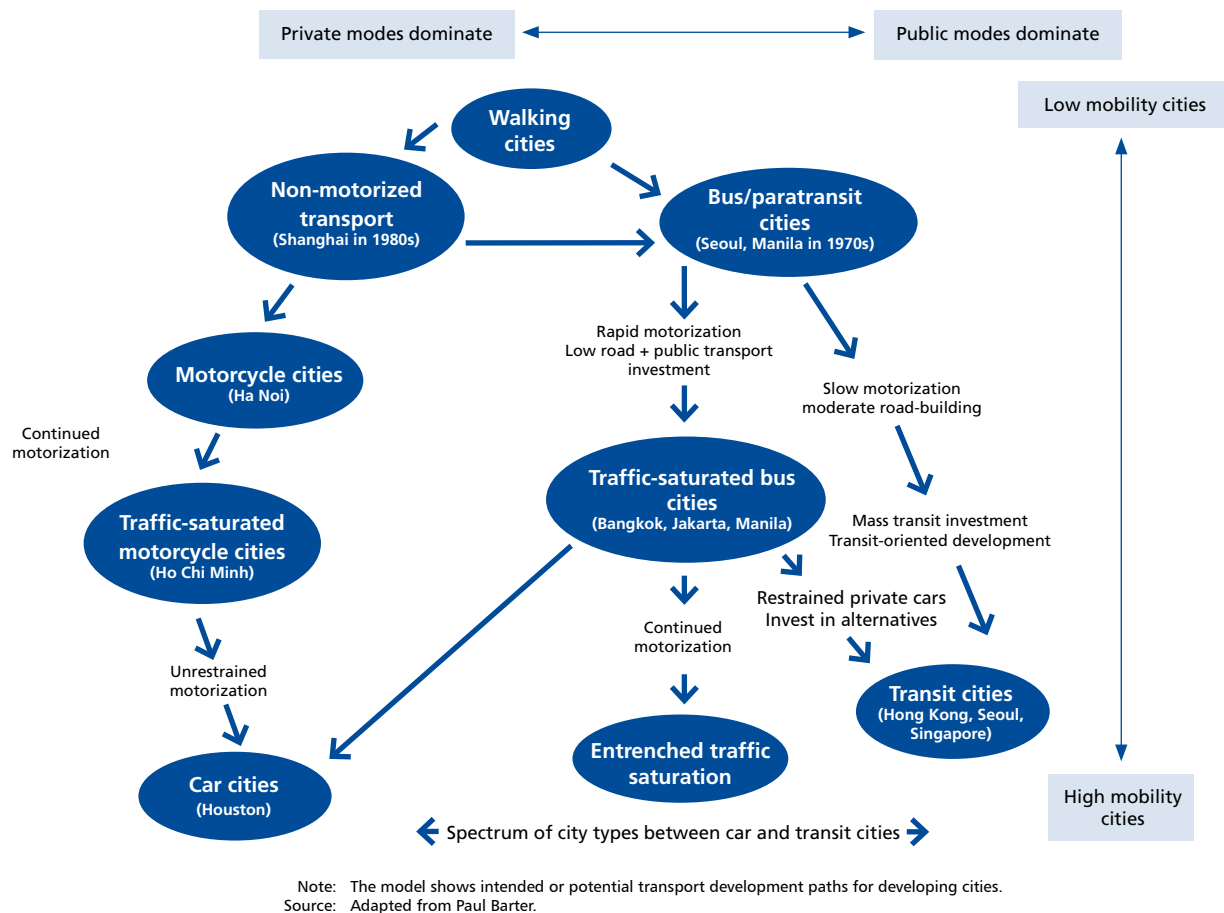
Dr. Paul A. Barter, Visiting Fellow, National University of Singapore

ADB'S NEW PARADIGM FOR SUSTAINABLE URBAN TRANSPORT

Aspect of transport policies/plans	Old paradigm	New paradigm
Goal	To provide mobility; road capacity is increased to meet forecasted demand; a traffic-centered approach	To provide accessibility; demand is managed to road capacity and public transport is central; a people-centered approach
Basis	Deterministic model forecasts by technical experts; outputs provide the answers: a detailed plan with good rates of return	Plans are based on sustainable policies and strategic planning; robustness, technical soundness, and stakeholder support are criteria for policy adoption
Preparation for an uncertain future	The future is largely ignored; trivial sensitivity testing	Preparation for the future is central; more relevant strategies and projects result
Content	Building projects, mainly roads within the city; frequent megaprojects	Management/integration of the existing transport system; focus on public transport; new roads shape the city's expansion and secondary roads catalyze infill development; megaprojects are pursued only after careful study
Financing	Affordability is assumed and only scant attention is paid to implementability	Affordability is an input and financial and technical planning proceed together; focus on implementability and operations
Stakeholder involvement	Plans devised by technical experts using transport models; little stakeholder influence	Strong stakeholder involvement and influence; technical inputs are fit for purpose; strong consensus is a requirement
Implementation	Seen as a problem to sort out later	Implementation processes are put in place and impediments are addressed early
Governance and institutions	The planning process is often politicized; often, technical analyses provide justification for political decisions	The planning process is technocratic and informs hard political decisions; improved governance is a prerequisite; the focus is on creating an enabling environment

RESEARCH EVIDENCE...

Since the 1960s, an important body of empirical research has studied the recent evolution of Asian cities. The findings show that periods of high economic growth are often associated with the rapid establishment and expansion of transport infrastructure. How cities respond at these times is critical, because their decisions lock the city into a certain development path that has strong implications for city efficiency and quality of life.



In 2004, Paul Barter, an urban transport specialist and professor at the University of Singapore, developed a typology of transport development paths that Asian cities have followed in the past.¹ Barter's model allows cities to assess their position and determine the direction in which they are headed in order to establish whether their policies are sustainable and what changes they must implement to follow a more desirable course.

Barter's main argument is that urban transport becomes sustainable when its focus shifts from providing mobility (movement) to providing accessibility (access to goods, services, and activities). To accomplish this shift, planners must remain focused on the overall purpose of transport planning—planning for proximity, or increasing access—rather than on meeting demand for greater mobility.

¹ Barter, Paul A. 2004. A Broad Perspective on Policy Integration for Low Emissions Urban Transport in Developing Asian Cities. Draft paper for the International workshop *Policy Integration towards Sustainable Energy Use for Asian Cities: Integrating Local Air Pollution and Greenhouse Gas Emissions Concerns*. Institute for Global Environmental Strategies, Kanagawa.

...AND BEST PRACTICES

In developing its new paradigm, ADB used Barter's typology and over four decades' empirical research on sustainable urban development. Barcelona, Bogotá, Curitiba, Dublin, Hong Kong, London, Munich, Seoul, Singapore, Stuttgart, Vancouver, Zurich—cities around the world have developed sustainably in crucial respects. None did so by accident, but by purposeful action maintained over time. ADB's analysis found that all success stories addressed three issues: management (how to manage the transport sector), financing (how to fund transport projects), and policy (what projects and programs to implement). Although no single best practice turned these cities around, the experiences analyzed here suggest that cities develop more sustainably when they meet the following conditions:

- City leaders must have the capacity to address the dangers that face their city. They must be able to marshal the political power necessary to provide the conditions for improvement and they must recognize that future development is largely in their hands.
- Stakeholders must understand enough of the fundamentals of sustainable land use/transport policy to share a strategic vision of the role of transport. The aim is accountable management and a virtuous circle of politics without politicking (often democratic control). A technocratic approach must be the constant theme.
- City leaders must be willing and strong enough to make difficult but necessary decisions.
- The political institutions that decide on transport projects must have the authority to drive those decisions through.



Promoting non-motorized transport and infrastructure



Bus rapid transit relieves congestion in Seoul, Republic of Korea

- Financial realism must be widespread and stakeholders must recognize that improvements are not cheap. Citizens need to recognize that they must pay more transport costs and city governments must find ways to increase municipal income. In addition, authorities must demonstrate that funds are well spent.
- Cities must apply strategic risk management processes in order to develop cities and transport systems proactively.
- Because megaprojects are particularly risky, great care must be taken in committing to and developing megaprojects. City authorities must also ensure that the allure of free central government financing does not distort their strategic imperatives.

In seeking to meet these conditions, it is important that developing cities adopt an incremental approach. Just as SUT demands pragmatism, so success requires a reasonable, location-specific action and implementation plan that recognizes that progress may be iterative rather than linear, with challenges and pitfalls along the way.

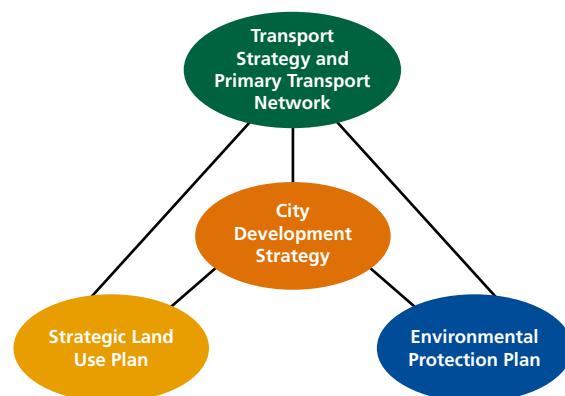
ELEMENTS OF A SUSTAINABLE URBAN TRANSPORT MODEL: MANAGEMENT

ADB's new paradigm for SUT has three components: management, financing, and policy. These components interact with each other: management (what to do) depends upon financing (what can be afforded), and both depend upon the capacity to determine the right strategy, implement that strategy, and monitor performance (policy).

Institutions and Governance

Insofar as management is concerned, the core theme of ADB's approach is the creation of a city authority with substantial self-financing powers and responsibility for strategic land use planning, transport, and environmental protection in its commuter catchment area. Increasingly, transport solutions require a package of measures to be effective. London's recent experience confirms that when a range of powers is vested in a single organization, measures can be implemented concurrently and major improvements become possible.

The organization of a city authority as depicted in this figure evolves slowly as the authority demonstrates responsibility and trust begins to grow. Central government, local government units, and, in some cases, major developers continue to play a role. Indeed, effective



development requires that all levels of governance have the power to act and that they do in fact act together across the catchment area.

ROLES OF DIFFERENT LEVELS OF GOVERNMENT IN SUSTAINABLE URBAN TRANSPORT

Planning level	Institution	Role
Policy	Central government	Creates an enabling environment based on accountability, participation, predictability, and transparency; confines its guidance to important issues; policies only change periodically
Strategic planning	City authority	Devotes considerable resources to identifying priorities, creating a vision and developing a structured process for the entire urban area; guides public and private sector decision-making and provides the basis for sectoral planning
District/local planning	Local government unit (LGU)	Considers both land use and transport needs; sets minimum standards that it has the means to enforce
Site-specific planning	LGU/developers	Integrates SUT planning into large developments and negotiates with communities

The starting point to creating or reinforcing a city authority is a diagnostic study that looks at how the city's transport sector is organized and how efficient and capable are the agencies involved—what they achieve, what financial resources they have at their disposal and what principal issues they face. The purpose of the diagnostic study is to develop a realizable vision of the city of the future. Translating that vision into action requires commitment,

political will and pragmatic leadership in a turbulent environment. In their response to these challenges, sustainable cities have shown themselves able to take advantage of windows of opportunity to make rapid, purposeful progress. To prepare for these occasions, capacity-building is necessary. This is where partnerships between cities and international financial institutions can be especially useful.

A NEW SUSTAINABLE URBAN TRANSPORT MANAGEMENT MODEL

Characteristic	Old model	New model
Decision-making powers	Weak powers distributed across LGUs; the central government dominates	Strong city authority with powers over the commuter catchment area; as cities grow, the boundaries of this area may have to be expanded
Decentralized powers	Strong central government; weak or no city authority; weak LGUs with little financing	Strong city authority sets strategy and coordinates with central government and LGUs; both the city authority and the LGUs have financing powers
Integrated land use/transport/environmental strategies	Little integration and competing interests	City authority has powers over multimodal transport, land use, and environment protection; debate of pros and cons a prerequisite to adoption of a strategy
Enabling environment	Often weak; political benefits take precedence over benefits to end users; ineffective private sector participation	Implementation processes are in use and effective measures exist to attract private sector participation
Governance	Closed processes with little stakeholder influence; an unpredictable environment that may be suborned by inappropriate influences	An open, participatory, and accountable approach and a predictable environment under the rule of law; competition and private–public partnerships are encouraged; where beneficial, foreign direct investment is attracted
Institutional structure	No strategic transport authority; duplication/omission/complex allocation of responsibilities among agencies	Strategic transport authority provides policy leadership and coordination; responsible agencies implement policies; separation of policy, procurement, regulation, and the delivery of services
Role of international financial institutions	Promote SUT policies without the necessary support/resources; technical assistance (TA) projects often ineffective; many loans are for major projects; implementation delays and cost overruns are common	Long-term partnerships with cities committed to implementing SUT policies; TAs provide necessary support; loans are for strategic priorities; results are widely disseminated

Implementation Processes

Much of the gap between transport plans and effective implementation can be explained by a lack of adequate implementation processes. These processes are indispensable features of sustainable cities and do not require more effort but rather more effective effort. Considerable planning and engineering resources are routinely deployed in most developing cities. These resources need to be directed more effectively.

One aspect of implementation processes concerns the increasing uncertainty of the future. Too often, the public sector in developing cities is reactive, buffeted by events, and struggling to keep on course. With the magnitude and complexity of risk growing by the year, it is essential that players manage how they conceptualize risk. The goal is for cities and transport sector to be managed proactively.

Risk management offers planners the opportunity to move rapidly from reactive to proactive management, eliminating surprises, identifying emerging trends, and providing a basis for sound corporate governance and control.

The content of transport strategy also needs to change. Much more adaptability can be built into transport projects than is current practice. It is also possible to create more resilient plans for critical infrastructure and to design projects that are fit for purpose in an unpredictable future.

Together with champions and institutional capacity, the following four implementation processes are central to SUT:

Process 1: An integrated urban transport planning system

National and city development goals are integrated and transport planning is multimodal. Transport is linked to the city's development and to protection of the environment. In this diagram, the national government takes the lead in catalyzing urban transport planning.



Process 2: A thorough urban transport planning cycle

Transport plans adhere to a logical task sequence that goes from setting broad city goals to securing the engagement of key stakeholders, implementing projects, and monitoring performance.



Source: K. Fang. 2007. *India: Sustainable Urban Transport Program. Proposed GEF Project*. World Bank Transport Forum, Washington, DC.

CITY OF LONDON PERFORMANCE INDICATORS

Every local authority in the United Kingdom is required to produce an annual monitoring report that charts its progress in achieving the policy objectives of its local plan. Objectives cover business development, housing, air quality, parking, and other aspects of civic life. Quantified performance indicators are identified for monitoring purposes and the results are made public to allow comparison between authorities. This creates pressure for improved performance. The City of London goes to great lengths to market its performance as a way of attracting foreign investment and helping to ensure future prosperity.

Process 3: A major project development procedure

Megaprojects such as metros, expressways, and airports are popular but have high opportunity costs and often fail to deliver the benefits expected. A successful major project development procedure eschews premature political and financing commitments, allows decisions to be made incrementally so as to ensure the relevance and effectiveness of the project as it becomes operational, operates in an enabling environment that incentivizes city authorities and private concessionaires to work in the public interest, ensures continuity from conception to use by focusing on key decisions and on operations, and is influenced by operator involvement at all stages to keep the project centered on operations (its core purpose).

Process 4: A transport asset and performance management process

The transport system comprises valuable assets (roads, equipment, etc.) that need regular maintenance, upgrading, or replacement. Most developing cities usually ignore this task as politicians and city authorities prefer to work on new projects rather than on mundane management. An effective transport assets process measures and monitors asset condition and performance, transport demand, and user satisfaction. It also communicates results to stakeholders. In some instances, the private sector operates maintenance and operating concessions. This has the added benefit of familiarizing the government with performance-based contracting. As for performance, it is clear that understanding implementation successes and problems

is vital to better policy and broad acceptance. Yet too often cities conduct monitoring merely to satisfy the requirements of international financial institutions. To implement transport policies effectively, cities must commit to performance monitoring and take care to select indicators that can be measured using the resources available.

Congestion charging in London





Promoting more energy efficient transport

ELEMENTS OF A SUSTAINABLE URBAN TRANSPORT MODEL: FINANCING

Affordability and Priorities

Without an institutional context that allows priorities to be ranked against available financing, transport strategies have little merit. Manila, the Philippines, adopted an innovative approach to address this issue. In 1982, Manila created an investment strategy for all municipal sectors: highways, public transport, water supply, sewerage and sanitation, garbage disposal, housing, social infrastructure, and others. Based on past expenditures and future prospects, it identified a set of projects that could definitely be financed and a second set of projects that could be implemented if additional funds became available. It used a transparent, comprehensible system to separate unambiguously good from unambiguously bad projects and to classify the remaining projects using

objective criteria and different weights for different scenarios. It did not seek precision or attempt to dictate outputs in detail. The strategy established the robustness of each project under a range of scenarios and provided a basis for dialogue with government agencies that questioned the rankings. Considerable progress was the result.²

Private–Public Partnerships (PPPs)

A wide range of PPP modalities can deliver better projects at a lower (or zero) level of public support, provide new sources of funds, improve capacity and levels of service, and ameliorate the operation and maintenance of

² Allport, Roger J. and N. von Einsiedel. 1986. An Innovative Approach to Metropolitan Management in the Philippines. *Public Administration and Development* 6 (1): 23-48.



TransMilenio improving access for Bogotá's inhabitants

existing infrastructure. Despite these advantages, Asia's PPP experiences have been much narrower than elsewhere and have revolved around new-build megaprojects such as metros and expressways. To determine whether PPPs are the right approach, it is important that planners understand the main project risks, only use private finance to transfer risks, expect the scale of private finance to match the risks transferred, and require private sector procurement to provide better value than the public sector alternative.

Innovative Financing

Innovate financing approaches and innovative sources of funding can be valuable complements to a sound financing strategy. One innovative approach consists of creating an urban transport fund that generates sustainable funding for transport projects. Another approach consists of creating incentives and deterrents that work together to promote SUT. With the United Kingdom's Transport Innovation Fund, for example, cities

that commit to a strategy to tackle congestion compete for central government funds for modal integration and improvements to their public and non-motorized transport systems. For political reasons, governments offer most incentives before implementing deterrents such as congestion charging, fuel tax supplements, vehicle registration, and/or parking fees. This ensures that travelers who wish to adopt more sustainable transport choices are not without alternatives.

Innovative sources of funding usually target the windfall beneficiaries of transport policies and projects. Examples include France's employers' taxes (*versement de transport*), the revenues of which are invested in new projects; joint development projects, as in the case of Hong Kong's MTR Corporation; and tax-increment financing, whereby governments earmark a portion of the increase in property or sales tax revenues that result from improvements to repay the costs of implementing the improvements. Certain climate funds are poised to become another innovative source of funding for transport.

In terms of financing, ADB's SUT paradigm adheres to the following guidelines:

- SUT policies are not necessarily low-cost and improvements do not come cheaply. Citizens must pay more taxes or user charges or find innovative ways of increasing city income. Complete financial realism is essential. If more funds become available (e.g., tax revenues are increased), then more improvements can take place.
- Transport decisions should be made by a city authority that has the power to raise substantial revenues. When the same body that decides on projects also finances those projects, accountable decision-making results. Self-financing also imposes prudent financial management.
- Obtaining a credit rating can help cities borrow on attractive terms. Credit ratings also reinforce disciplined financial planning, as good ratings are jealously guarded.
- Technical and financial planning must proceed jointly and concurrently to avoid embarking upon projects that turn out to be unaffordable.
- Responsibility is reinforced when city authorities have a major stake (are at risk) in major projects. This avoids cities competing for "free" central government funds that may distort their city development strategy and undermine good governance.
- City authorities should determine the major spending priorities in their cities and create flexible funding mechanisms. Earmarking financing for specific activities or projects reduces planners' flexibility to respond to changing circumstances.
- Great care is required before committing to megaprojects. Megaprojects can throw a city strategy off course if forecasts are not realized.
- Some cities depend on loans from international financial institutions in order to develop projects. To reinforce the development impact of these loans, city authorities should ensure that the loans incentivize good governance.
- In large countries with many cities, central governments should consider incentivizing city authorities to adopt and implement SUT policies as India did with its National Urban Transport Policy.
- While innovative financing may have a role in transport projects, it is unrealistic to see innovative funding as a guarantee for sound city transport finances.
- PPPs have many merits but they often require large public funding or in-kind support and have major impacts on a city. City authorities should develop projects through to business case and decide the terms of procurement with care.

ELEMENTS OF A SUSTAINABLE URBAN TRANSPORT MODEL: POLICY

Before the advent of energy efficiency and climate change as policy concerns, sustainable cities defined SUT policies as access-based transport planning that focused on planning for proximity. To control traffic congestion, cities combined the “carrot” of public transport with the “stick” of demand management. Wright and Fulton (2005)³ have shown that when steps are added to control vehicles and fuels, this approach meets the requirements of energy efficiency and climate change mitigation programs.

This section discusses “Avoid, Shift, Improve” and other policy tools that promote SUT and development.⁴

AVOID: Reducing the Need for Travel

Accessibility requires mixed land uses in dense cities where arteries are not blocked by congestion. Historically, many Asian cities have measured up well to this ideal, with a range of services and amenities located in each neighborhood. In more recent times, however, indiscriminate land use has forced residents to make greater use of motorized transport. The remedy is judicious land use planning that reduces residents’ need to travel and cuts back on urban sprawl, pollution, and congestion.

SHIFT: Changing Mode Choice

Both the “stick” of traffic restraint and the “carrot” of attractive public transport are necessary to reduce transport-related problems. While it is rarely politically feasible to control car ownership, controlling car use meets with less resistance. Developing cities should implement parking policies, congestion charging, car pooling and other measures. Where these policies are not possible, cities may consider fuel surcharges with vehicle license duties that reflect the vehicle’s impact on air pollution and other externalities. The net revenues from these measures should be invested in improving the public transport system to secure acceptance for necessary but unpopular policies.

“A gallon of fuel conserved, or a ton of air emissions avoided due to reduced vehicle travel [...] is worth an order of magnitude more than the same energy savings and emissions reductions provided by increased vehicle fuel efficiency or shifts to alternative fuels. This occurs because mileage reductions also reduce traffic congestion, road and parking facility costs, consumer costs, accidents... pollution, and sprawl, and often improve mobility options for non-drivers.”

Todd Litman, transport expert

In addition to these “sticks,” two “carrots” can set cities along a sustainable path. First is the introduction of competition into the bidding for supply of public transport services. This is necessary to develop efficient, market-facing services. Second is the early integration of bus priority ways, busways, bus rapid transit, light rapid transit and/or metro systems into cities’ expansion and development plans. Today, bus rapid transit systems (physically segregated busways in the center of the roadway, with fares prepaid at fast boarding/alighting road-level platforms) are riding a wave of enthusiasm. At the same time, no city with a metro appears to regret having gone down that path.⁵ A sound choice between these and other options rests on realistic assessments—

³ Wright, L. and Fulton, L. 2005. Climate Change Mitigation and Transport in Developing Nations. *Transport Reviews* 25 (6): 691-717.

⁴ Litman, Todd. 2008. *Smart Transport Emission Reductions: Identifying Truly Optimal Energy Conservation and Emission Reduction Strategies*. Victoria Transport Policy Institute. www.vtpi.org/ster.pdf.

⁵ Bogotá’s TransMilenio rapid bus system carries 53,000 passengers/hour/direction, Bangkok’s Skytrain carries 50,000 passengers/hour/direction, and Kuala Lumpur’s PUTRA, a light rail transit service, carries 30,000 passengers/hour/direction.

assessments that may change over time. In medium-sized and low-income cities, for example, busways may provide the basis of the mass rapid transit system for many years. If affordability increases or environmental concerns become critical, then light rapid transit may play an important role. In the largest corridors of major cities, metros may be required. Secondary corridors may then justify busways, light rapid transit lines, or upgraded suburban rail systems.

An integral part of influencing mode choice is road management. In managing existing roads, planners must balance competing demands from frontagers, pedestrians, cyclists, buses, and other traffic. Too often, this equates to maximizing motorized traffic capacity to the detriment of non-motorized road users. Meanwhile, the nature and location of new roads are central to determining the city's development: radial roads create ribbon development while road networks help develop previously inaccessible areas. Road networks should therefore be developed to facilitate the movement of people and goods, not private cars. Road capacity improvements should focus on developmental roads and strategic/missing links. Not only can these measures influence mode choice and alleviate congestion and pollution, they can also lessen poverty by ensuring that dwellers of peripheral areas, usually the poor, have better access to services.

IMPROVE: Increasing the Energy Efficiency of Vehicles and Fuel

The energy efficiency and climate change agenda require controls on vehicles and fuels. With these controls in place, transport policy packages can drastically mitigate the adverse consequences of motorization by reducing distances travelled and lowering carbon dioxide emissions and local air pollution (nitrogen oxide, sulfur oxide, and particulate matter).

Achieving these objectives requires a combination of technology, measures to encourage the rapid take-up of the technology, and regulation that controls emissions by ensuring that vehicles are properly maintained. Movements in this direction include the Global Fuel Economy Initiative (also known as the 50 by 50 Challenge), a program to improve fuel economy by 50% worldwide by the year 2050; and the European Union's

adoption of the Green Paper, which promotes the use of clean, energy-efficient technologies, and other measures. Whether Asia will progress on the paths advocated in these initiatives depends on the region's openness to the latest technology and the replacement rate of the vehicle fleet in response to standards and enforcement.

Implementing Integrated Land Development

In coming years, virtually all of Asia's population increase will occur in urban areas. Asia's cities are expected to grow by over 40 million per annum at the same time that urban densities fall as a result of increasing wealth, declining household size and central area redevelopment. The result is that most developing cities are likely to at least double in size over the next 20 or so years. All strategies recently developed to address this issue involve increasing the quantity and the quality of new land for development.

One way to bring more and better land under development is through land use planning. In most developed country cities, land use planning systems allied to the expansion of primary road, rail and metro networks enabled urban expansion to proceed in a controlled manner. This reduced adverse environmental impacts, supplied adequate land for residential and other uses, and resulted in an acceptable standard of physical and social infrastructure. Most developing cities' planning systems are modeled on those of developed countries. Yet minimal enforcement, institutional and technical weaknesses within planning departments, greater susceptibility to political intervention, and the unwillingness of land owners to submit to controls have rendered these systems largely ineffectual. Changing these conditions would require a sea change in attitude. With the exception of the People's Republic of China and perhaps Viet Nam, therefore, it seems unlikely that land use planning will do much to increase the availability of new land for development in the short or medium term.

A more realistic means of increasing the quantity and quality of new land for development may consist of direct interventions by city governments to influence the scale, location, and type of land development that takes place. Governments can construct homes; obtain land through expropriation, negotiation, or compulsory purchase;



Combating urban sprawl requires integrated policy measures

guide or regulate land development; and/or conduct land pooling/land restructuring whereby land for roads is obtained from owners at minimal cost in exchange for the gains that accrue once land values increase. Because a large proportion of the land used by lower income groups is developed by informal and small landowners, government partnerships with these constituents is essential. To maximize success, governments should formalize their agreements with developers and render those agreements more transparent.

A third and very efficient tool for securing more land for development is the transport network. Without access, whether by foot, cart, truck, bus or car, there is

no development. Yet city authorities rarely deploy their authority to develop roads as a means of managing the city's growth. The first step towards redressing this situation is to create links between what is planned and what is implemented. This requires a strong spatial planning process that includes transport planning and has the full buy-in of all stakeholders: national and city governments, public works departments, major developers, and civil society. The second step is to develop area road networks (both arterial and secondary roads) in fringe areas where development is desirable. Design and construction guidelines in these areas should be consistent with the needs and means of future low-income occupiers: if standards are too high

and procedures too cumbersome, they will be ignored. Public transport services should also be provided from the outset.

In summary, cities that aspire to sustainability need a new approach to land use planning and development

that makes use of both incentives and deterrents. The incentives are the approval and legitimization of developments, increased land values, and the provision of road access and infrastructure. The deterrents are the ceding of land for infrastructure, increased charges, and adherence to planning and design standards.

A NEW APPROACH TO LAND USE AND DEVELOPMENT

Component	Old paradigm	New paradigm
Strategic planning	Non-existent or insufficient strategic planning; lack of integration between land development and transport networks	Preparation of a city spatial strategy to improve quantity and quality of land development for the entire population; zoning restrictions reduced except in environmentally sensitive areas
Local area and site planning	Exists only for middle and high income developments; otherwise, affordability and bureaucratic procedures deter formal planning; as a result, city governments neglect the needs of residents in low-income areas; informal sector developers operate as they wish and the slums of the future are born	Introduction of more flexible regulations; legitimization, where possible, of existing settlements; more land zoning and more regulation of land development; better coordination between transport planners and developers of low-income housing, off-site infrastructure, and community facilities; new interchanges reflect transit needs
Secondary roads	Little investment in secondary road networks results in inefficient ribbon development and inaccessible fringe areas	Focus on planning and implementing area road networks where and when land development is desirable; public transport services are integrated from the outset
Planning process	Little engagement with stakeholders, developers, and land owners, especially with informal sector	Stakeholders influence proceedings; formal consultation procedures result in projects and services that are relevant and well maintained
Knowledge about city development priorities	Little knowledge about city development priorities	Diagnostic studies identify spatial trends, densities, and informal development processes; land demand projections inform the city development spatial strategy, which sends strong signals to private developers



Access for all

POVERTY ALLEVIATION

Poverty reduction is the overarching goal of ADB and many other multilateral and bilateral agencies. In recent years, urban poverty has decreased in the People's Republic of China by over 50% and has fallen significantly in East Central Asia. In Southeast Asia, urban poverty declined by just over 10% but at 34%, the incidence remains high. Yet in South Asia it has increased by over 20% and there has been negligible change in its incidence. With the possible exception of the People's Republic of China, therefore, urban poverty is likely to remain a serious issue throughout Asia for the foreseeable future. To be effective, SUT policies must address urban poverty. Without poverty reduction, sustainable urban development is impossible.

ADB's research shows that the residents of low-income residential areas on the urban fringe face particular transport-related problems: poor access to and within communities, insufficient or unaffordable public transport, and great distances to employers and various facilities. In contrast, problems are fewer when the poor live in or near central areas where public transport is widely available. Central areas are, however, more susceptible to traffic accidents and air pollution, especially where pedestrian traffic and informal street trading activities are high.

Transport policies can target these problems in two principal ways. First, geographical targeting consists of interventions to improve accessibility for the residents of under-served, poor and low-income settlements on the urban fringe. These interventions consist mainly of improved road access to and within these settlements. They could also include conditions for public transit operators to provide services to these areas and improvements to social and physical infrastructure that reduce residents' need to travel. It is not generally

necessary to disaggregate the travel needs of the poor from those of other low-income groups, as the differences between them are not especially marked. In many cases, transport policies can be targeted at low-income groups in general rather than at the poor in particular.

The second way that policies can address problems specific to the poor is by targeting poor and vulnerable households or individuals for better access to public transport. Examples are fare concessions for the poor, students, the elderly, and the disabled; improved design of public transport vehicles to make them accessible to the disabled; and reserved seating areas for women. In general, however, these types of measures are unfeasible or of low priority in the presence of limited financial or institutional capacity or little centralized regulation of bus services. Furthermore, unless applied in such a way that operators are fully compensated for the loss of fares, they can also have the perverse impact of reducing the supply and quality of public transport by lessening operators' revenues and their willingness to invest.

People-centered transport systems





Restoring neighborhoods through pedestrian-friendly environment

Even when not targeted at the poor, however, SUT policies can benefit low-income residents. Improved public transport, enhanced pedestrian facilities, reduced emissions, safer roads—these and other components of SUT policies help poor and non-poor alike. Indirect positive impacts also occur where improved transport systems contribute to economic growth and help create more flexible and larger labor markets. But transport interventions can also have unintended consequences. Better enforcement of emission controls, for instance, can make some forms of public transport less affordable. Road or rail construction can cause residents to lose their land or their livelihood. Even regulating paratransit modes (e.g., rickshaws) or banning vendors from sidewalks can impoverish the most vulnerable. Identifying these impacts in the project design phase, creating mitigation measures,

and formulating compensation packages are integral parts of SUT policy. The absence of such processes can lead to social discontent and impoverishment and/or policy inertia as projects involving land acquisition are shunned.

How can cities that lack implementation capacity, either because of a lack of political will or because of insufficient financing and institutional facilities, address both sustainable transport and poverty alleviation? ADB's SUT paradigm suggests the following:

- Supporting and promoting non-motorized transport and existing public transport services and prioritizing low-cost projects that can be implemented by existing institutions;

- Improving the capacity of existing road maintenance, traffic management, and regulatory departments;
- Identifying and developing solutions to major accident black spots;
- Developing workable approaches to regulating emissions;
- Improving access to poor and low-income residential areas through upgraded secondary and tertiary roads; and
- Building capacity.

These interventions have the merit of being relatively low cost and within the power of many existing city agencies, namely, departments responsible for road maintenance, vehicle inspections, air quality monitoring, and public transport regulation. Most importantly, they bring benefits to poor and non-poor travelers alike. In addition, when successful, these interventions can raise the public's confidence in the performance of municipal government and facilitate more ambitious programs at a later date.



CONCLUSION

The crisis of urban accessibility that is paralyzing many Asian cities is news to no one. Population growth and decreasing densities have led many cities to expand, and the ownership and use of private cars has vastly outstripped expectations. Although traffic congestion has long been identified as a problem, it continues to worsen in almost all of the region's urban areas. Citizens are becoming increasingly aware of local air pollution and are experiencing a range of associated health problems. Asia's accident rates are among the world's highest and policy makers worry about greenhouse gas emissions and the threat to fuel security posed by dwindling oil reserves and highly volatile fuel prices. The sector has awakened to transport's own "inconvenient truth,"⁶ but traditional policy and investments make it ill-equipped to respond. Meanwhile, the crisis is threatening to cripple cities' ability to stimulate economic vitality, an ability that often accounts for as much as 70% of national gross domestic product.

ADB calls for the adoption of a new SUT paradigm that meets these challenges head-on. This paradigm manages demand for travel to supply instead of building more and more infrastructure for the seemingly unstoppable growth in private vehicles. It calls for increased governance and broader stakeholder involvement in the decision-making process to ensure that projects prioritize the travel needs of the end user. And it mandates increased realism in the decision-making process, whereby institutional, financial, social, economic, and environmental considerations are given equal attention to ensure inclusive and environmentally sustainable growth.

The new SUT paradigm also calls for a fundamental shift in transport policy and advocates the "avoid-shift-improve" approach. It argues that planners should integrate land use developments with mobility needs to minimize the need for travel. They should promote energy-efficient modes of transport, particularly public transport and non-motorized transport such as bicycles and walking, and seek to strengthen vehicle and fuel technologies, exploring alternate fuel sources, and reducing local and global emissions.

Precedents for all of these measures exist: we have only to decide to use them. By working together, Asia's cities and ADB can create safer, cleaner, more sustainable cities, and a better quality of urban life.

⁶ Guggenheim, Davis. 2006. *An Inconvenient Truth*. Paramount Classics.

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Changing Course: A New Paradigm for Sustainable Urban Transport

Most Asian cities have grown more congested, more sprawling, and less livable in recent years, and statistics suggest that this trend will continue. Rather than mitigate the problems, transport policies have often exacerbated them. In this publication, ADB outlines a new paradigm for sustainable urban transport that gives Asian cities a workable, step-by-step blueprint for reversing the trend and moving toward safer, cleaner, more sustainable cities and a better quality of urban life.

About the Asian Development Bank

ADB's vision is an Asia and Pacific region free of poverty. Its mission is to help its developing member countries substantially reduce poverty and improve the quality of life of their people. Despite the region's many successes, it remains home to two-thirds of the world's poor: 1.8 billion people who live on less than \$2 a day, with 903 million struggling on less than \$1.25 a day. ADB is committed to reducing poverty through inclusive economic growth, environmentally sustainable growth, and regional integration.

Based in Manila, ADB is owned by 67 members, including 48 from the region. Its main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.